

*Working Together to Deliver the Best Solutions Quickly*

## ***The Naval Undersea Warfare Center Division Newport***

**22 September 2008**

**Presented to:**

**TTCP ASW Systems and Technology Panel**

**By:**

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**Technical Director NUWCDIVNPT**

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# Mission and Vision

## Mission

The Naval Undersea Warfare Center Division Newport provides research, development, test and evaluation, engineering, analysis and assessment, and fleet support capabilities for submarines, autonomous underwater systems, and offensive and defensive undersea weapon systems, and stewards existing and emerging technologies in support of undersea warfare. Executes other responsibilities as assigned by the Commander, Naval Undersea Warfare Center.

## Vision:

Undersea Superiority: Today and Tomorrow





# Warfare Center Roles

- Ensuring the technical community understands the warfighter's needs
- Developing, integrating and maintaining systems for warfighting
- Providing technical solutions for warfighting problems when impractical for industry
- Evaluating solutions to enable smart buyer decisions
- Verifying that ships and weapons systems are safe and effective: Tech Authority
- Providing life cycle technical support for ships, submarines and related warfare systems
- Maintaining vital technical capabilities and facilities not commercially feasible
- Providing the technical linkage for interdependence with the Joint force, the Coast Guard, homeland security and other agencies.

# Working Together to Deliver the Best Solutions Quickly

## Warfare Centers

Science &  
Technology

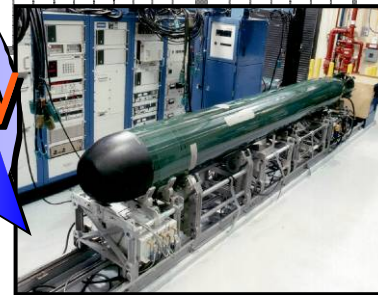


Development

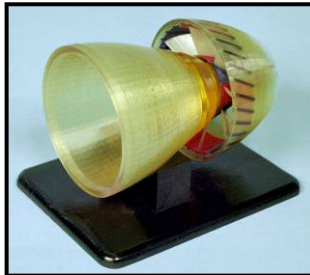


**INNOVATION**

Acquisition  
Support



Fleet  
Support



Prototyping



Undersea Warfare  
Analysis



Test & Evaluation

**Operating Principles: (1) Teamwork, (2) Integrity, (3) Accountability, (4) Initiative, (5) Respect**





# Division Newport: A Century Of Progress

**1869**



**Naval Torpedo Station  
at Goat Island  
1869 - 1951**

- Torpedo Repair
- Torpedo Ranging and Testing
- Torpedo School

**1945**

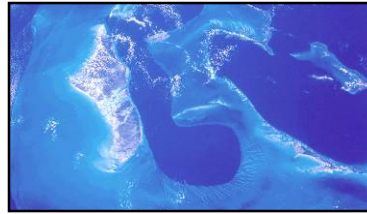


**Underwater Sound Lab  
New London, CT  
1945 - 1970**

- Pioneers in Sonar Systems Development



**1966**



**Naval Undersea Weapons  
Research and  
Engineering Station  
1966 - 1970**

**1970**



**Naval Underwater  
Systems Center  
1970 - 1991**

- Growth of Test and Evaluation Functions

**Today**

**Naval Undersea Warfare  
Center Division, Newport  
1992 - Present**

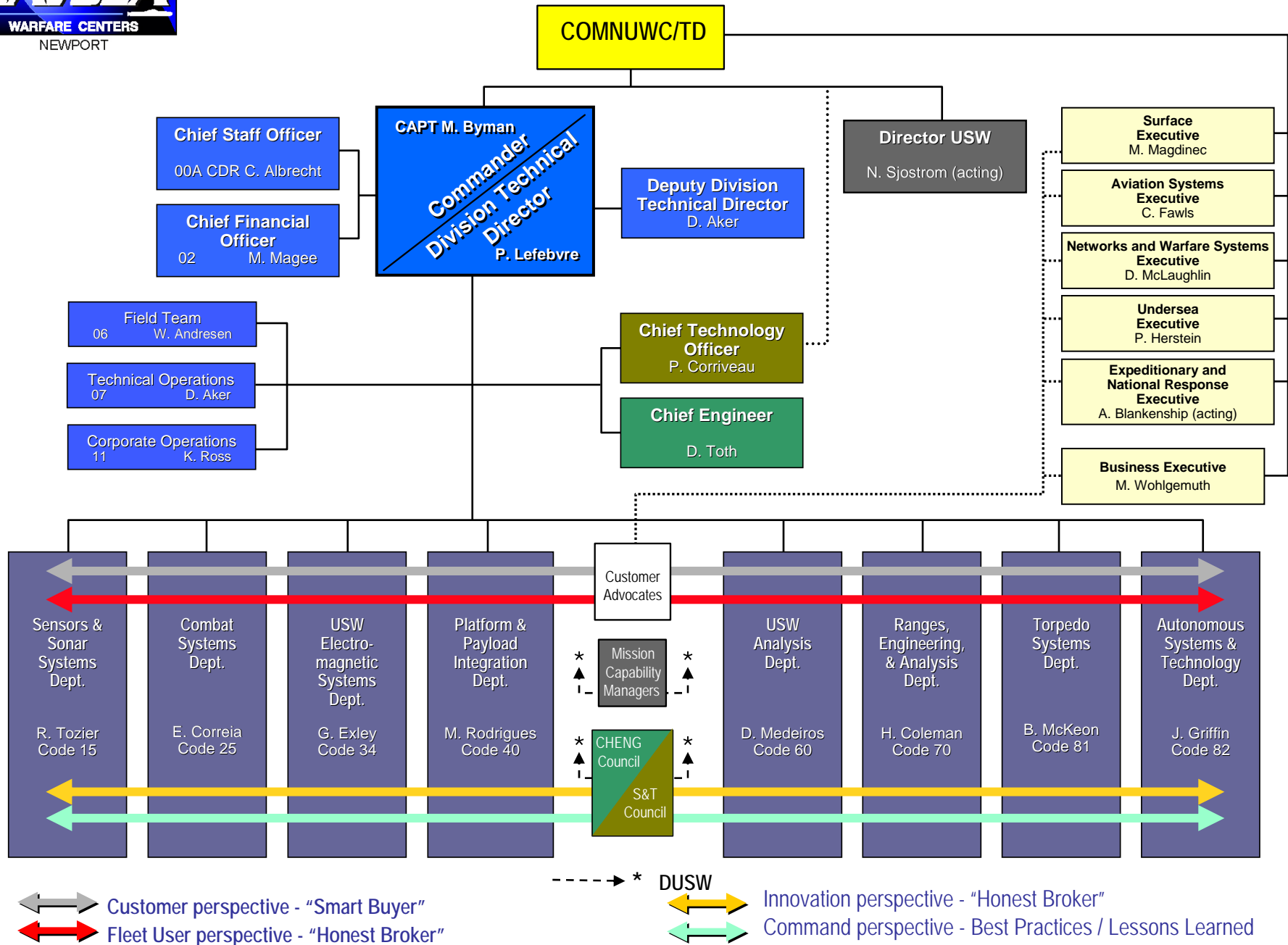
- Test and Evaluation
- Engineering and Fleet Support
- Autonomous Underwater Systems



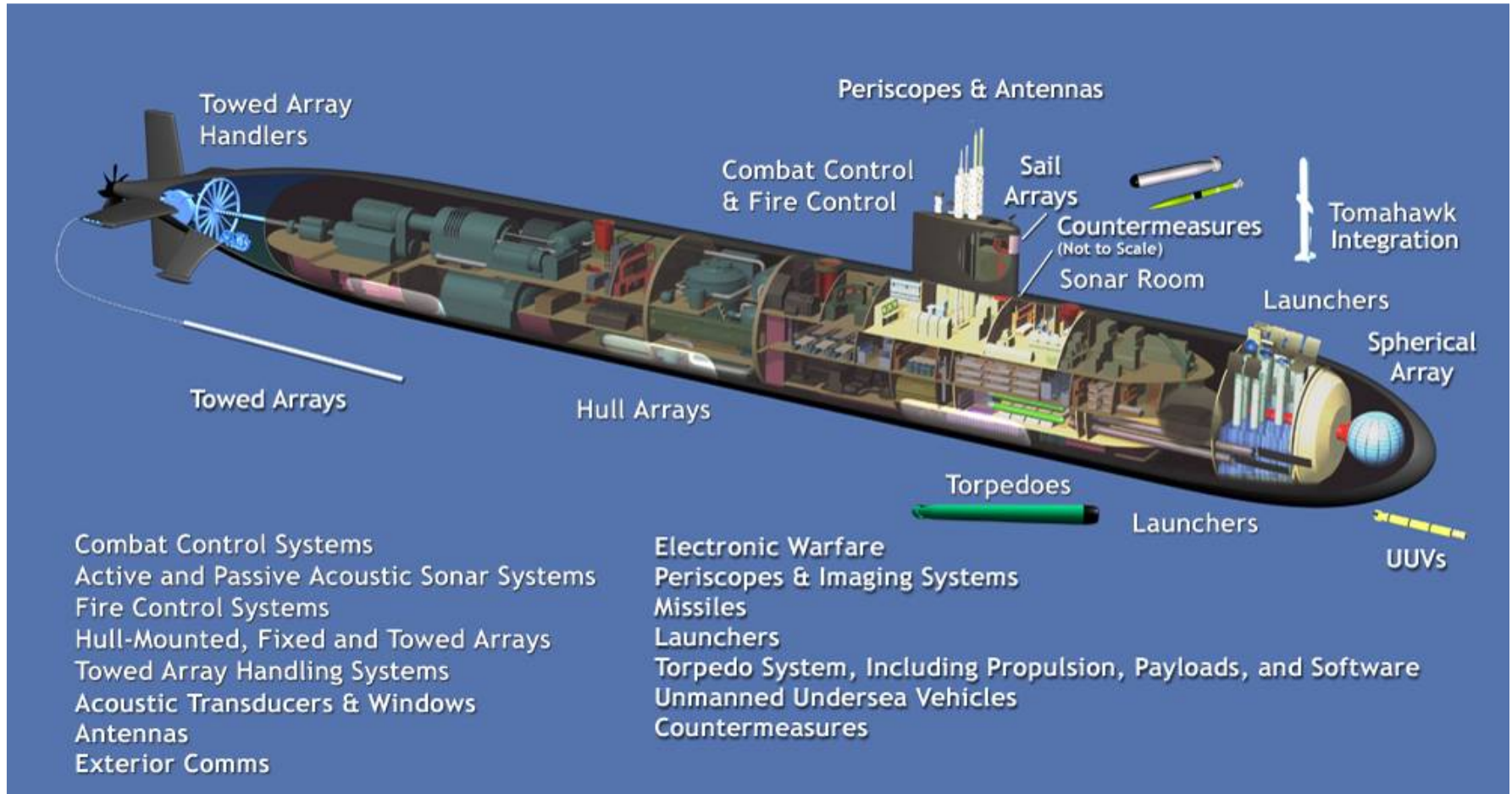
***At the Forefront of Undersea Systems Development for Over a Century***



# Division Newport in the NUWC Organization



# NUWC's Contribution to Submarine Technology





# NUWC's Contribution to Surface Ship Technology

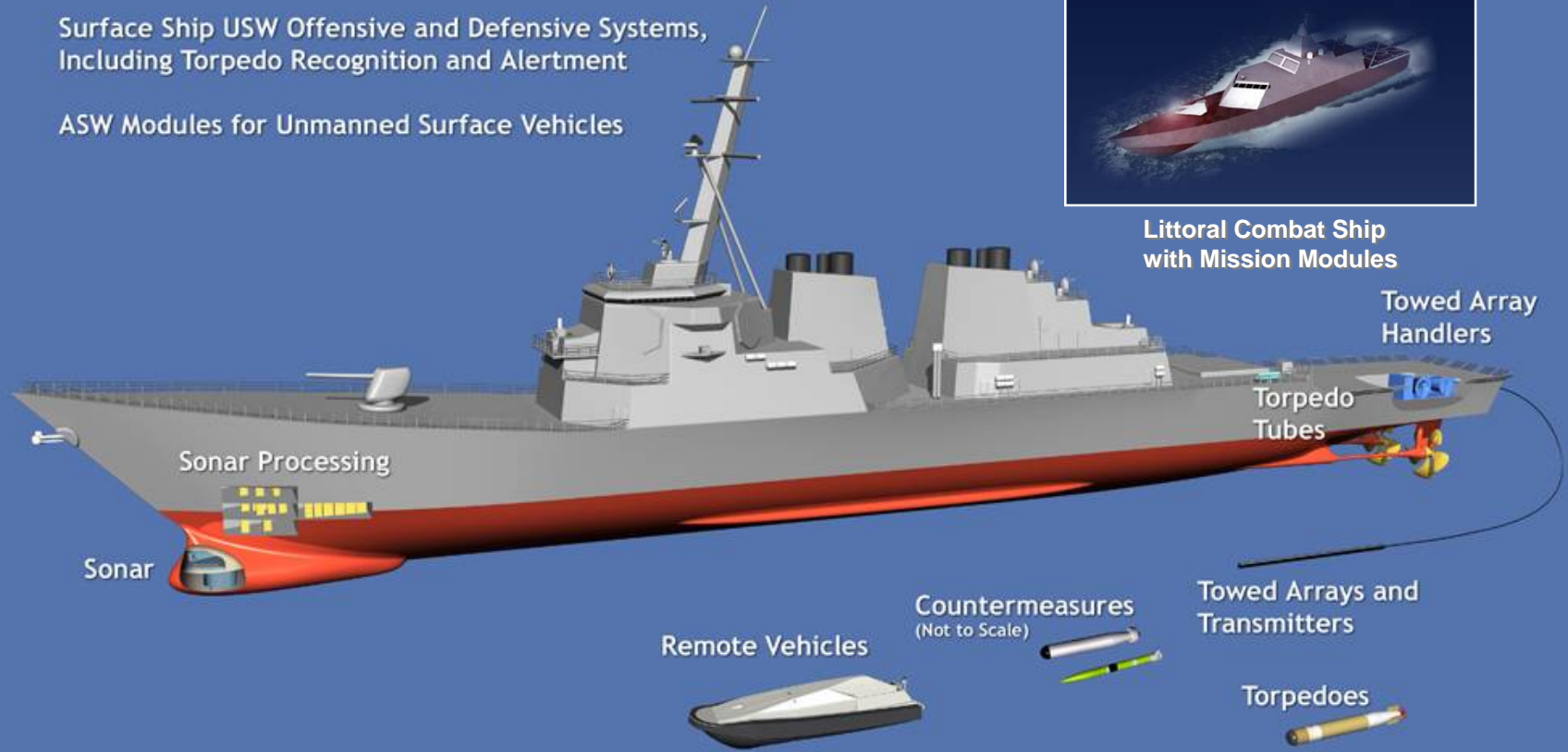
Surface Ship Sonar

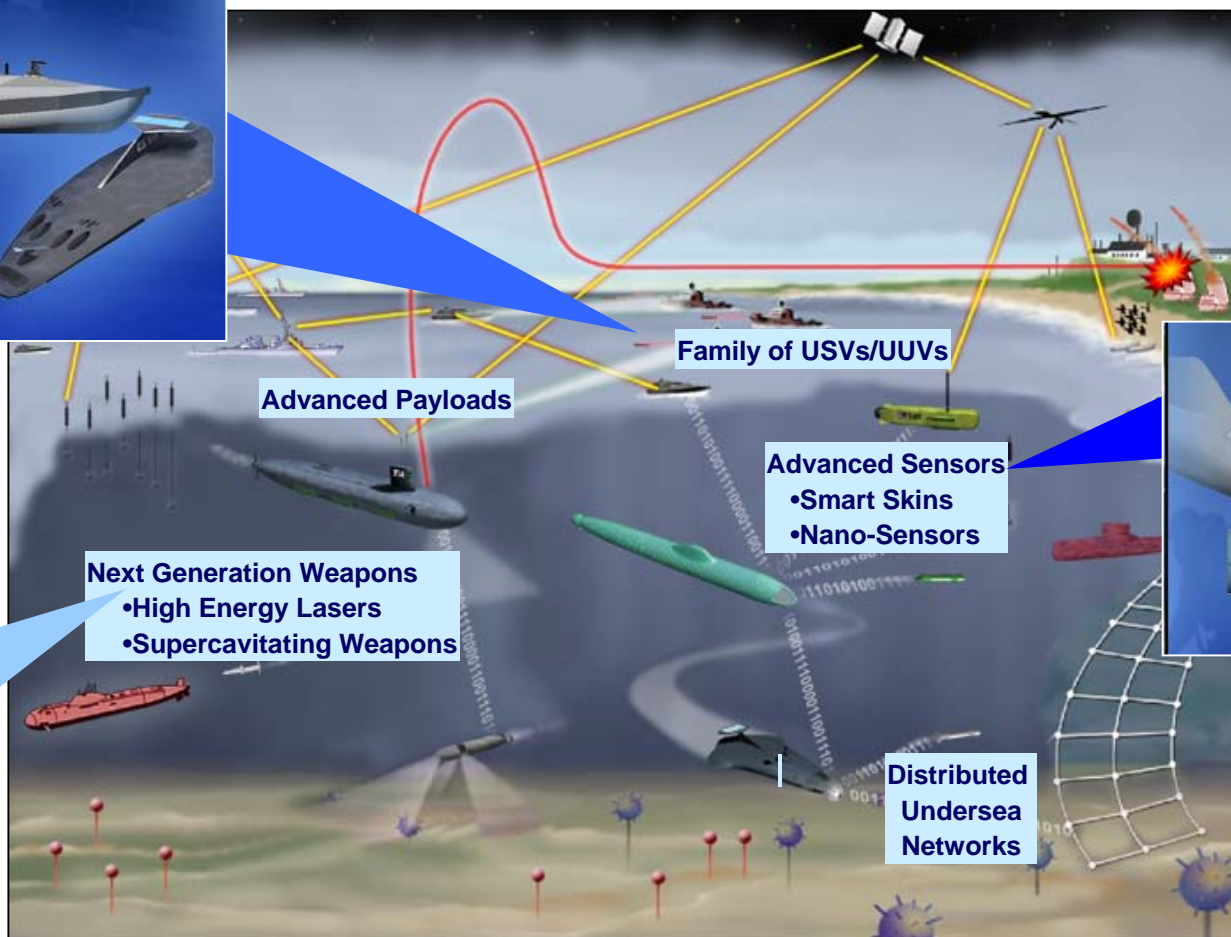
Surface Ship USW Offensive and Defensive Systems,  
Including Torpedo Recognition and Alertment

ASW Modules for Unmanned Surface Vehicles



Littoral Combat Ship  
with Mission Modules





# SEAPOW 21 – Transformation for the Navy

# Supporting NAVSEA's Technical Authority

## NUWCDIVNPT Technical Warrant Holders

16) Submarine Training Systems – Thomas Wohlgemuth

1) Distributed Undersea Sensors – Fred McMullen

15) USW Defensive Systems – Daniel Labella

2) USW Operational Assessment – Michael Psikakos

14) Unmanned Underwater Vehicles – Daniel French

3) Chief Systems Engineer – Undersea Warfare – Peter Herstein

13) Torpedoes – Robert Tompkins

4) Sonar Systems – Submarines – Harold Watt

12) Machinery - Launcher HM&E Systems – Submarines – James Tinkham

5) Combat and Weapons Control Systems – Submarines – Robert Oliveira

11) USW Launcher Systems – Payload Integration – Carlos Galliano

6) Sonar Systems – Surface Ships – Robert O'Connor

10) Missile Launcher Integration – Submarines – Raymond St. Amand

7) Integrated USW – Patrick Kelley

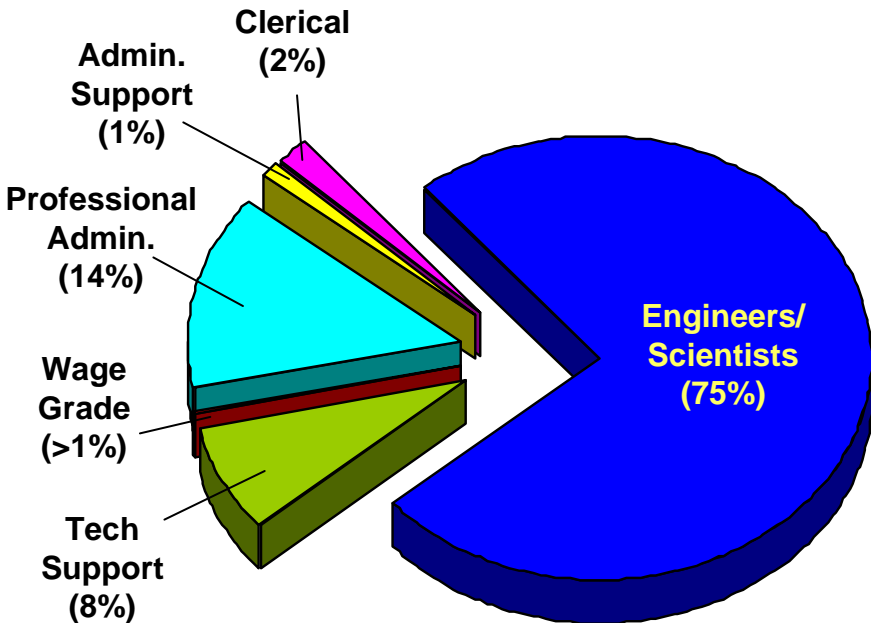
9) Exterior Communications and Antenna Systems – Submarines – Gerard Exley

8) Imaging, Electromagnetic, Electro-Optic, and Electronic Warfare Systems – Submarines – Dr. Francis Chan

***Foremost Technical Authority for USW***



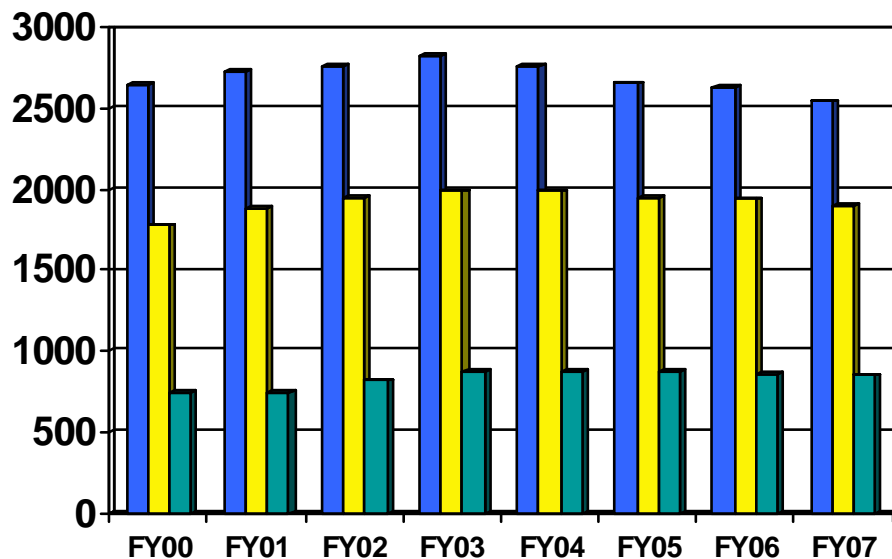
# Our People



FY07	
Civilian	2544
Military	31

## Advanced Degrees

45% of Our Scientists and Engineering Staff Have Advanced Degrees



■ Total Onboard ■ S&E Onboard ■ Advanced Degrees

**75% Of Our Workforce are Engineers and Scientists**  
**Advanced Degrees - 136 PhD's (7%) And 711 Master's (37%)**





# World Class Recognition



## NDIA

- 3 time Bronze Medal
- 2 time Ferguson Systems Engineering Group Award



## Assistant Secretary of the Navy Awards

- 5 time Top Scientists and Engineers of the Year



## NAVSEA Scientist of the Year Award



## Training Magazine

- Training "Top 125" Company



## Hispanic Engineer National Achievement Awards Conference

- Role Model of the Week
- Lifetime Achievement Award



## Chief of Naval Operations Award

- Achievement in Safety Ashore
- Environmental Award Natural Resources Conservation



## Department of the Navy

- 2 time Nathaniel Stinson Equal Employment Program Achievement Award
- 2 time Hispanic Employment Achievement Award



## Women of Color Magazine

- Technology All-Stars Award



## Office of Naval Research

- ONR Science Advisor of the Year
- Conrad Award for Scientific Achievement
- Science & Technology for America's Readiness (N-STAR) Award
- Cheapskate Prize for Affordability



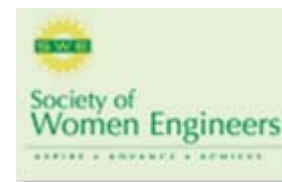
## Federal Laboratory Consortium

- 3 time Excellence in Technology Transfer Award
- Laboratory Director of the Year Award



## Commander, Navy Region Mid-Atlantic

- Community Service Award for Educational Outreach Plan



## Society of Women Engineers

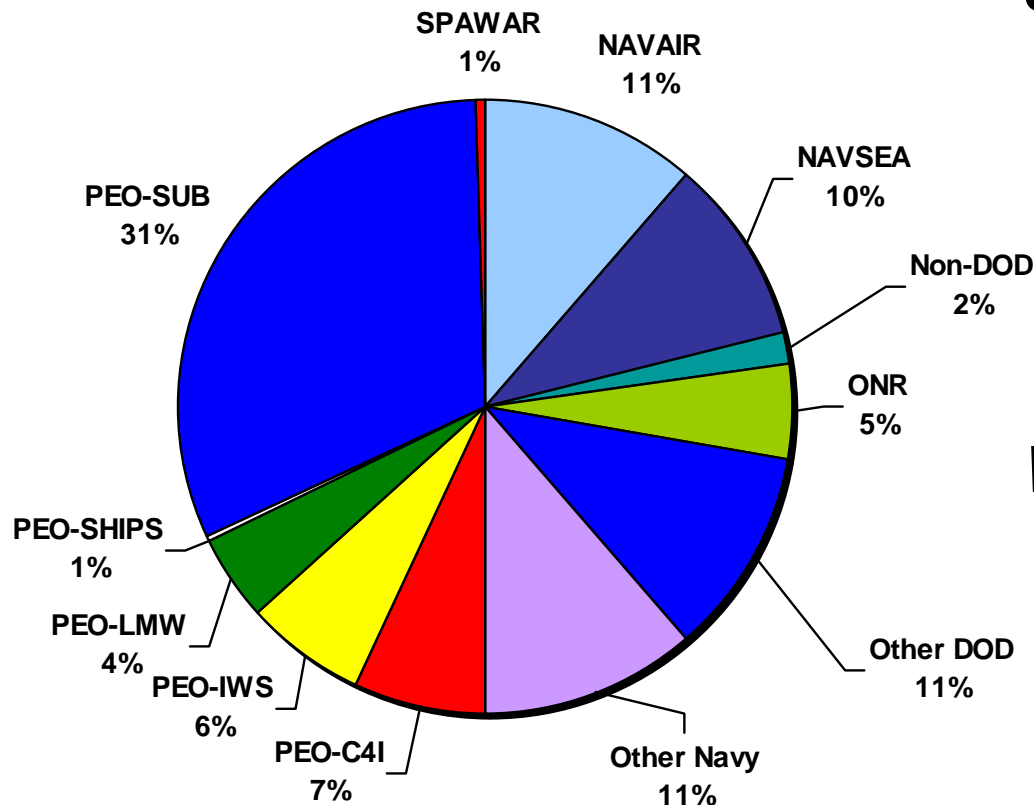
- Rodney D. Chipp Memorial Award -- fostering an environment supportive of women engineers

***Recognized for Excellence--Business, People, and Products***





# NUWCDIVNPT Customer Base (FY07 Actual)



## *Spectrum of Customers*

- Fleet
- Program and resource sponsors
- Scientific sponsors
- Intelligence community
- Defense industry
- Non-defense industry
- Foreign Navies

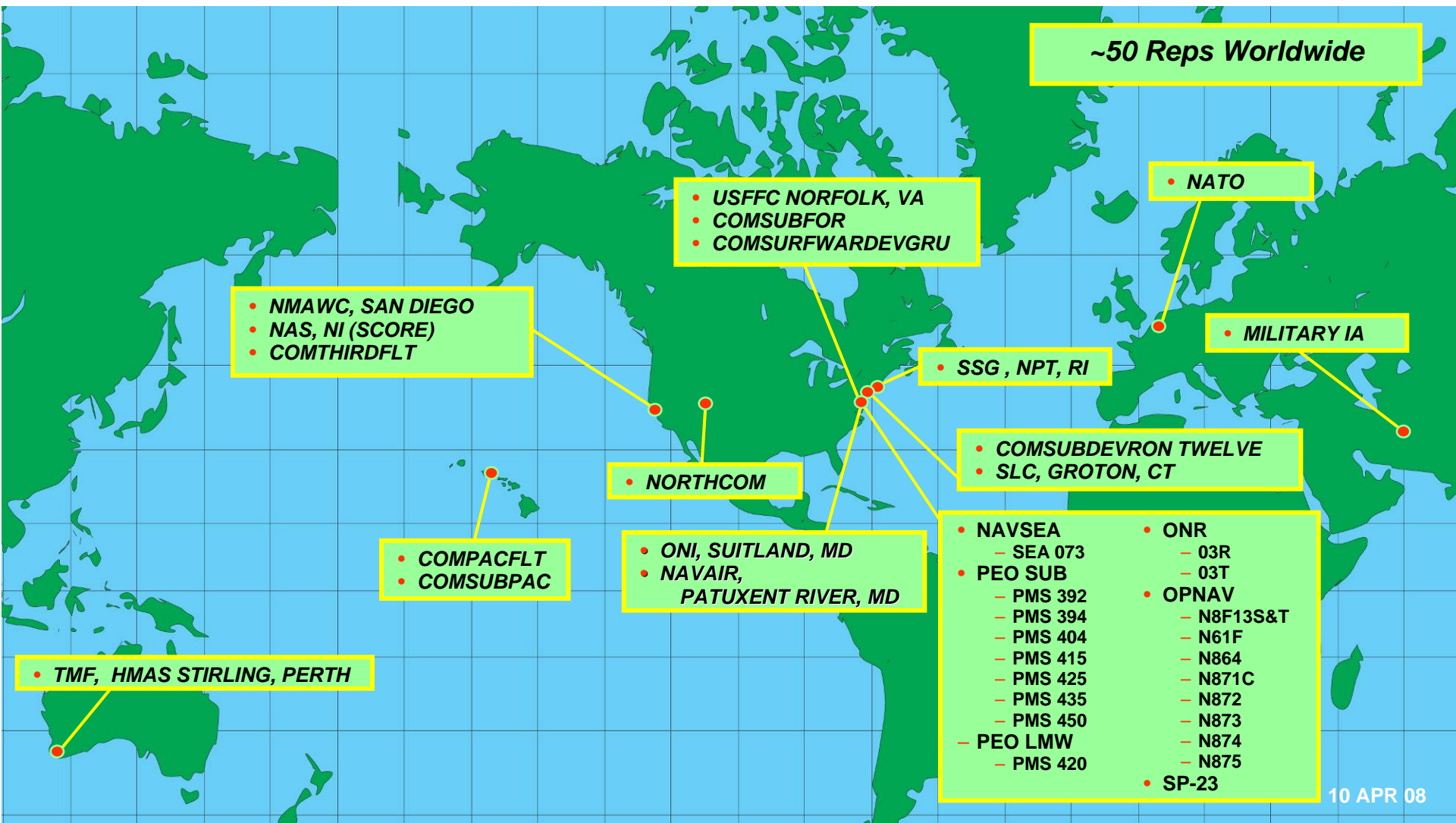
## *We are a NWCF Activity*

- We're not a congressional line item
- Customers decide whether to bring work to the Warfare Centers
- NUWC is accountable for efficient delivery of products and services

***Provide Best Value to Our Customers***



# DIVNPT On-Site Representatives

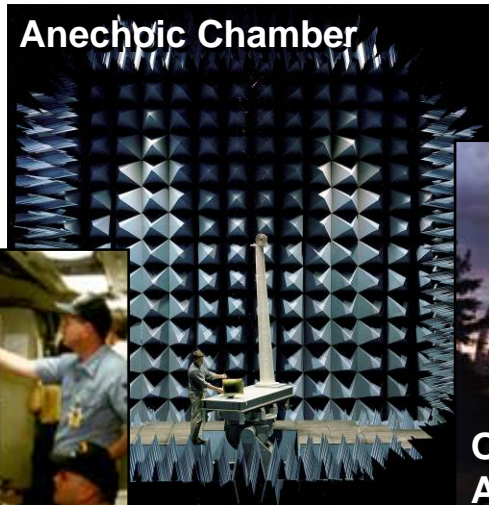


10 APR 08

*Our Forward Presence Enables Rapid Response to Fleet Needs*

# Unique USW Facilities

- Are highly specialized for USW
- Have full life cycle application
- Reduce cost, risk, and development time
- Make use of state-of-the-art simulations and networking



*Undersea Warfare Focus*





# Technical Departments







# Sensors & Sonar Systems Department

Full spectrum RDT&E directed toward underwater sensors & sonar systems for all platforms as well as off-board distributed and unmanned systems. Focused on analysis, technology base, advanced & full-scale development, in-service & system engineering, supportability, life-cycle hardware and software support for all aspects of USW and associated areas of GWOT.



WE COVER THE CURRENT AND FUTURE  
WATER-FRONT WITH OUR PRODUCTS



## PRODUCTS AND CAPABILITIES

- ✓ Active and Passive Acoustic Systems
- ✓ Environmental Acoustic Technology and Systems
- ✓ Hull-mounted, Fixed, and Towed Sonar Systems
- ✓ Offboard Sensors and Sonar Systems, Including Distributed Systems
- ✓ Human Systems Integration for Manned & Unmanned Systems
- ✓ Sonar Trainer Systems
- ✓ Transducers, Materials, Measurements, and Standards
- ✓ Underwater Acoustic Communications Systems
- ✓ Underwater Off-Board Sensors and Sonar Systems
- ✓ Underwater Non-Acoustic and Environmental Sensors
- ✓ Unmanned Vehicle Sensors and Sonar Systems

# Combat Systems Department

*End-to-end command and control systems engineering, integration, test and certification for USW combat systems across platforms*

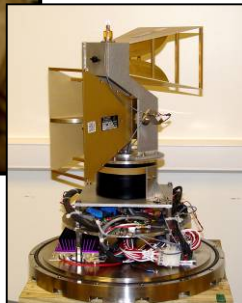
- TDA for all SSN, SSBN, and SSGN Class Combat Systems
  - RAN Collins Class Submarine
- SWFTS Systems Integration, Test and Platform Integration
  - TI04, AN/BYG-1 TI-00/TI-02/TI-04, SSGN NPES Rev 9, CCS MK 2, AN/BSY-1, CCS MK 1, CCS Revisions, DWS MK 118
- Submarine ATWCS, TTWCS and Nuclear Weapon Safety
- Platform/Weapon Connectivity and Interoperability
- USW CS/UUV/UAV Systems Engineering and Platform Integration
- Information Assurance for USW Combat Systems
- Open Systems Architecture and Human Systems Integration
- Logistics Engineering During Combat Systems Development
- Configure, Integrate and Deliver SubLAN for SSN688/688i, Seawolf Class, SSBN and SSGN
- Design, Develop, Deploy Common Basic Operator Trainer and Submarine MM Team Trainer Trainers
- Define, Integrate and Test SSGN Modernization Baseline
- FMS of Harpoon Engagement Sub-System to the Royal Australian Navy and to Republic of Korea



# USW Electro-Magnetic Systems Department

**Development and Support for USW Communications and Electromagnetic systems including:**

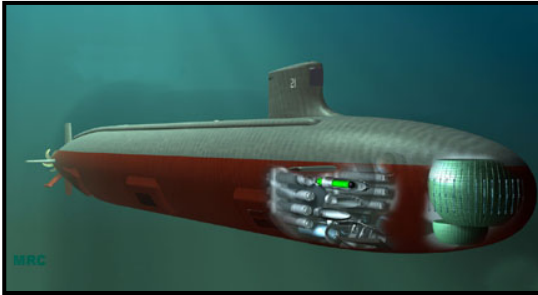
- Antennas
- Periscopes
- Electronic/Information Warfare
- Communications
- Electro-Optics Systems
- Electromagnetic Compatibility for Submarines, UUVs, UAVs, USVs, USW Networks, and Distributed USW Systems and Sensors
- East Coast Periscope National Maintenance Facility





# Platform & Payload Integration Department

**Submarine  
Launcher  
Systems**



## Development and Support for Submarine Missile/Payload Integration, and USW Launcher Systems:

- Submarine Tactical Missiles
  - All-Up-Round (AUR) and Systems Integration
- Submarine Payloads/Precision Strike
  - Payload/Platform Integration
- Submarine Launcher Systems
- Surface Ship Undersea Warfare Launchers



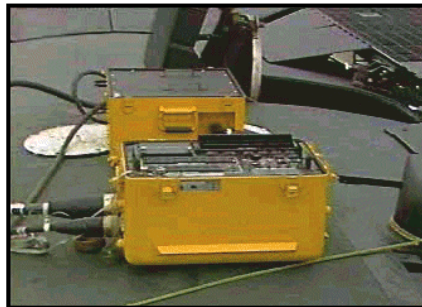
**Vertical Launch Systems**



**Surface Ship Launch  
Systems**



**Tactical  
Tomahawk  
& Follow-On  
Strike Weapons**



**Missile Simulator Design &  
Development**



**Capsules & Support Equipment**



**Countermeasure  
Launcher Systems**



# Undersea Warfare Analysis

## Warfare Center Core Equity

- External Customers Span the USW Community
  - Intelligence, S&T, Acquisition, T&E, Fleet
- Internal Support to Ensure NUWC's Efforts Stay Aligned and Relevant

## Mission / Force / Platform Level of Analyses

## Full Spectrum of Undersea Warfare

- ASW , ASUW, ISR/IO, STK, SOF, MIW, STRATEGIC DETERRENCE



***Our Mission: Derive and provide high quality, timely, and objective analyses for our customers that will enable them to make better-informed decisions***



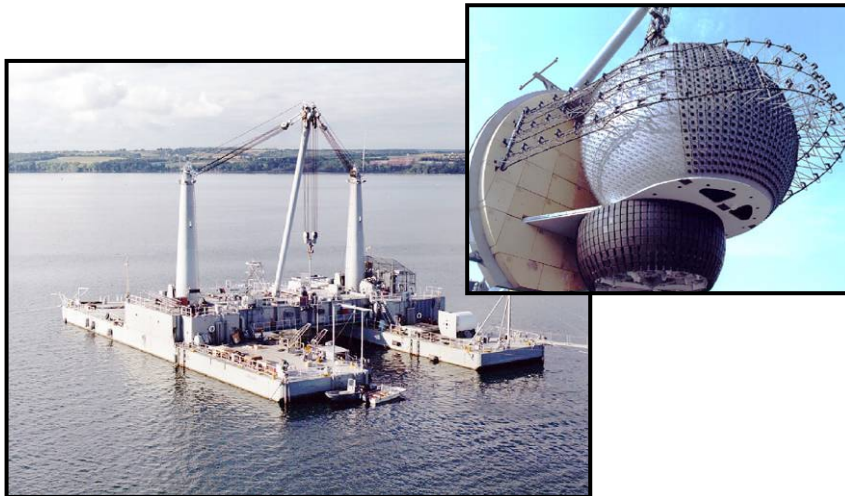
# Ranges, Engineering & Analysis Department



Undersea Range Management & Development

Code 70 provides full-spectrum development, engineering and test resources supporting Navy acquisition programs, including:

- AUTC Program Management
- Major Test Facilities Management
  - Dodge Pond Acoustic Measurement Facility
  - Seneca Lake Acoustic Test Facility
- Undersea Range Technology Development
- Undersea Range Installation and Lifecycle Support
- Design-for-Manufacture Engineering Analysis
- Prototype Development and Fabrication
- Simulation-Based Development
- Environmental Qualification Testing and Analyses



Major Test Facilities Management



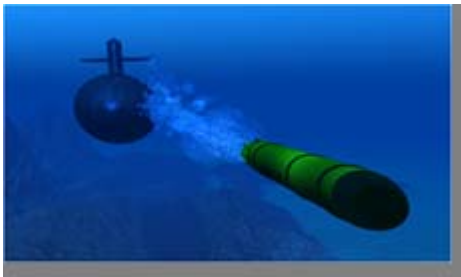
Shipboard Environment Qualification Testing

# Torpedo Systems Department

*A full spectrum center of excellence for full life cycle support for the development, acquisition & modernization of all U.S. Navy Heavyweight and Lightweight Torpedoes, and advancement of torpedo technology to other mission areas and multi use applications.*

## HEAVYWEIGHT TORPEDOES

- CBASS/APB (MK48 MOD 7)
- ADCAP (MK 48 MOD 5/6/6 ACOT/6AT)
- MK 48 MOD 4



- Weapon Acquisition Engineering
- Advanced Processor Build (APB)/Torpedo Modular Upgrade (TMU) Process
- Fleet Performance Assessment
- Tactics Development
- Test & Evaluation
- Reliability Assessment & Improvement
- Training
- Torpedo Downloads
- New Array

## COLLABORATION BASE

### *Sponsors, Customers, and Partners*

OPNAV	TYCOMs	PEO-SUB
- N77/87	DEVRON	- PMS404
- N76/86	ONR/ONI	- PMS415
- N41	COTF	DOT&E
KPT	ARL/PS	ARL/UW
NSWC	NWDC	Training Fac.
CMD	SWDG	SURFPac/Lant
VX-1	PCOIs	Sub/Air Sqd.
IMAs	SLR/SOBT	AIRLant/Pac
COMSUBLANT/PAC Industry Contractors		
International Partnerships		

### Technical Competencies

- Systems Engineering
- Weapons Analysis Facility
- Software Development
- Quality Production & Logistics
- Hardware Development
- Propulsion & Mechanical Systems
- Test Equipment
- Test & Evaluation
- Fleet Engineering Support
- Tactics & Training

## LIGHTWEIGHT TORPEDOES

- MK 54
- MK 50
- MK 46



- MK 54 Acquisition Engineering
- Mk 54 P<sup>3</sup>I and Block upgrade
- Fleet Performance Assessment
- Tactics Development
- Test & Evaluation
- Reliability
- Training
- Mk 54 Tech Insertion 1



Canada



Netherlands



Japan



Greece



Australia



Turkey



Egypt



Taiwan



Brazil



# Autonomous Systems and Technology Department

## Science and Technology for:

- **Torpedoes**
- **Autonomous Undersea Vehicles (AUVs)**
- **Countermeasures/Counterweapons**

## System Development, Integration and Test

- **AUVs**
- **Mobile ASW Targets**
- **Undersea Defense Systems**

## Acquisition and In-Service Engineering

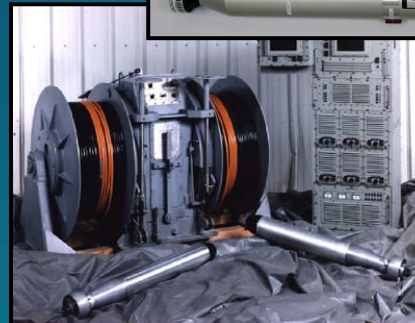
- **AUVs**
- **Mobile ASW Targets**
- **Undersea Defense Systems**



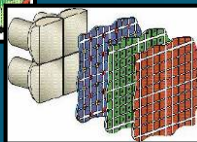
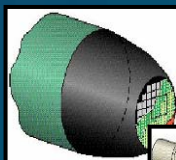
AUVs & Mobile Targets



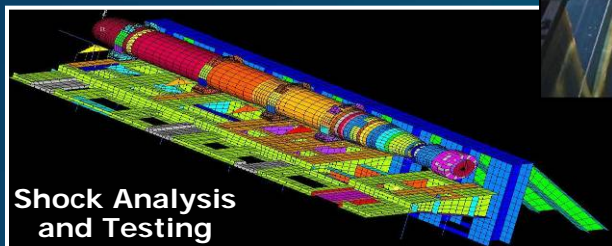
## Undersea Defense Systems



## Electric Torpedoes



## Science & Technology



## Shock Analysis and Testing







# Birdseye View

- The Navy's only laboratory dedicated to full spectrum USW
- We have both military and civilian leadership
- We operate as a NWCF, not a separate line item in the Defense budget
- We are accountable for efficient delivery of products and services
- We are a Public Trust not a business



## *Customers*

- Fleet
- Navy Program sponsors
- Scientific sponsors
- Intelligence community
- Defense industry
- Non-defense industry
- Foreign Navies

## *Assets*

- 104 Buildings
- 256 Acres
- \$566M Asset Value
- Unique National Facilities

## *People*

- 2544 Civilian employees
- 15 Technical Warrant Holders
- The nation's experts on USW
- Highly educated & dedicated to Fleet excellence
- 75% are Scientists & Engineers; 45% have advanced degrees

***We're a \$923.9M Organization that Produces Product not Profit***